



NTSB National Transportation Safety Board

Office of Aviation Safety



Air Traffic Control: Human Performance

William J. Bramble, Jr., Ph.D.
Senior Human
Performance Investigator

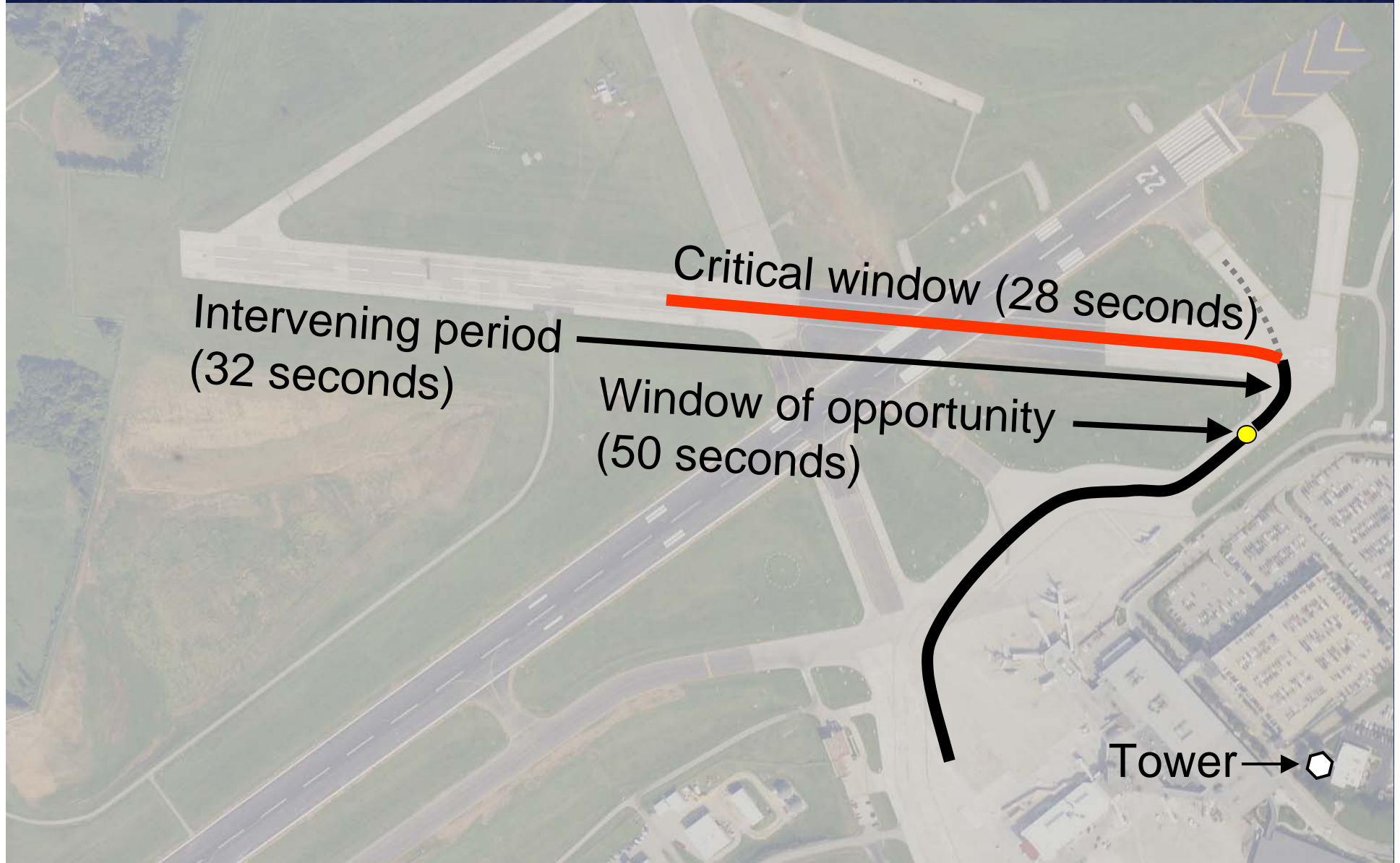
FAA Policy

- Federal regulations do not require monitoring of taxi and takeoff
- First priority to ensure separation and issue safety alerts
- Secondary priorities depend on controller judgment

Contextual Factors

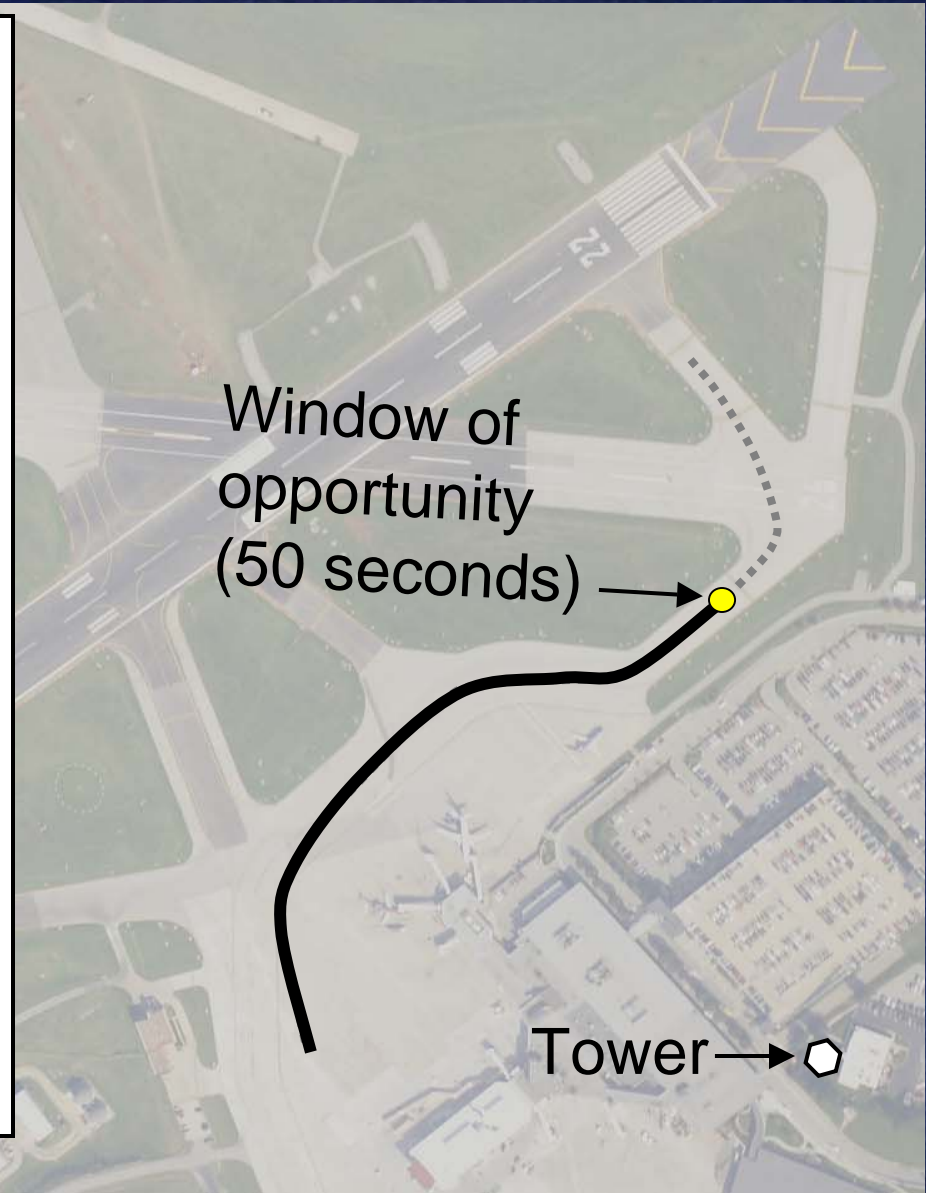
- Short taxi
- Only one lighted runway
- Route marked with lighted signs
- Controller had never seen similar event
- Expected flight crew to call if lost

Signs of the Flight Crew's Error



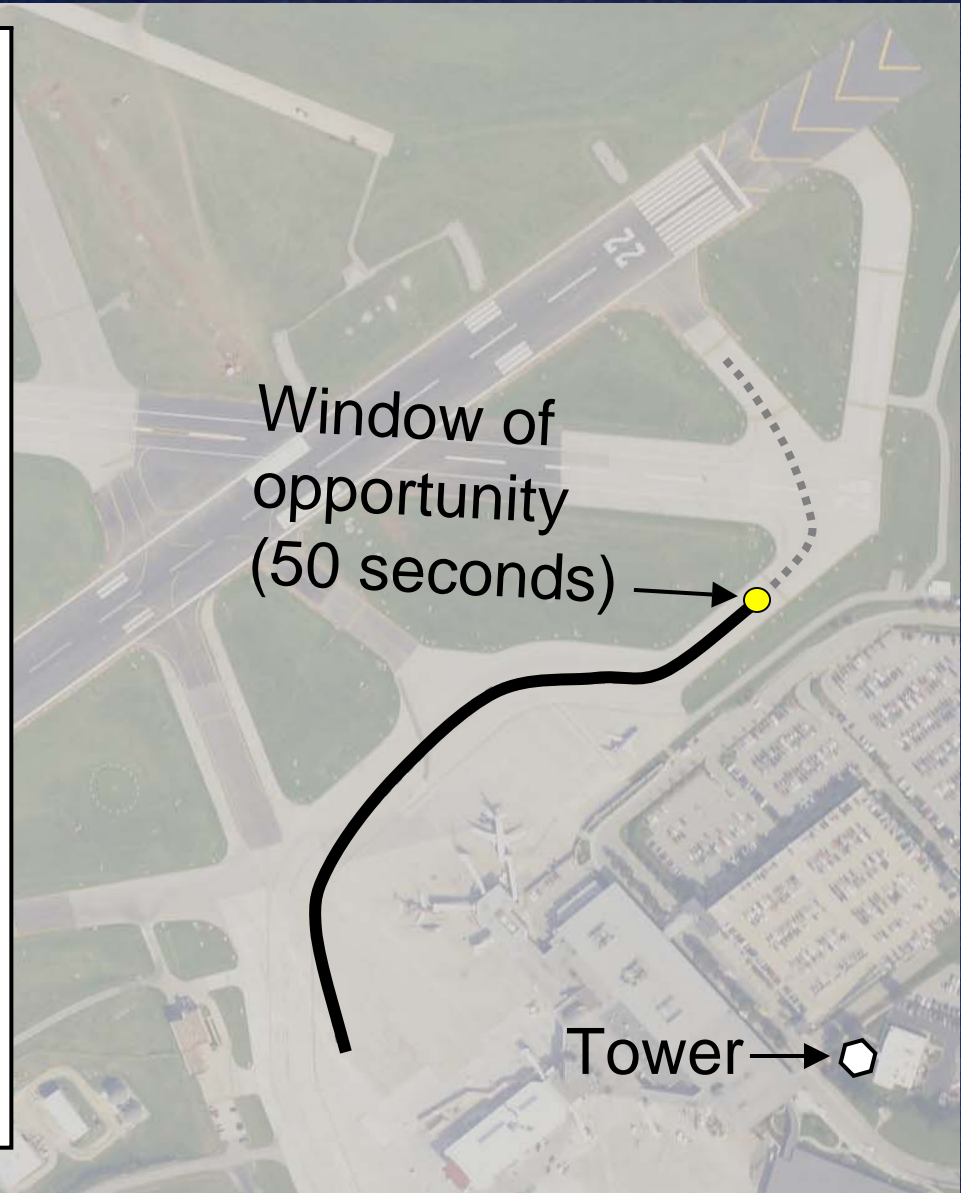
Window of Opportunity

- Controller performing concurrent tasks
- Scanned runway when issuing takeoff clearance
- Did not notice airplane stop
- Paid more attention to radar tasks



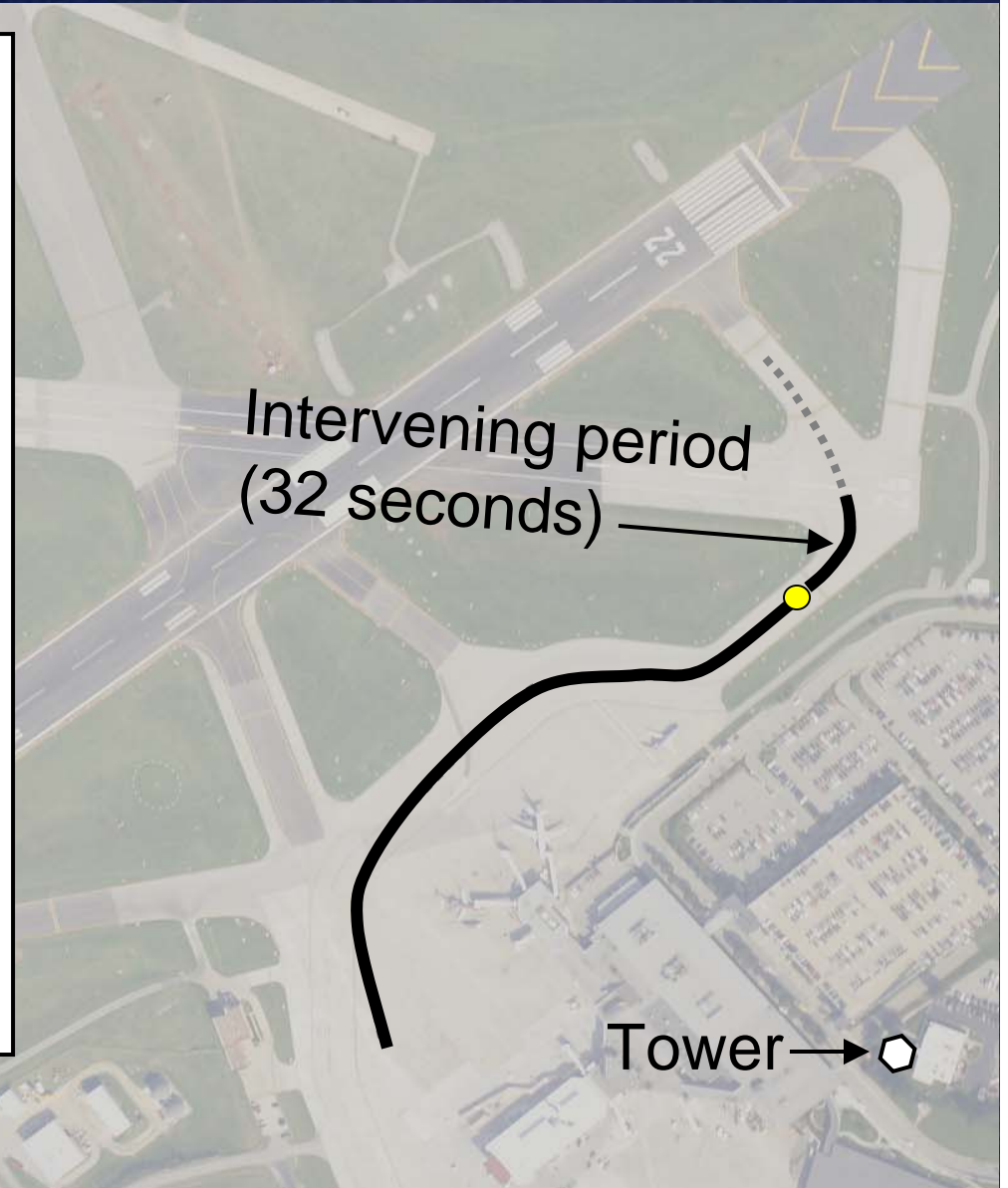
Window of Opportunity

- Controller performing concurrent tasks
- Scanned runway when issuing takeoff clearance
- Did not notice airplane stop
- Paid more attention to radar tasks



Intervening Period

- Controller handed off departure
- Comair taxied as expected
- Break in active control tasks
- Controller elected to perform an administrative task

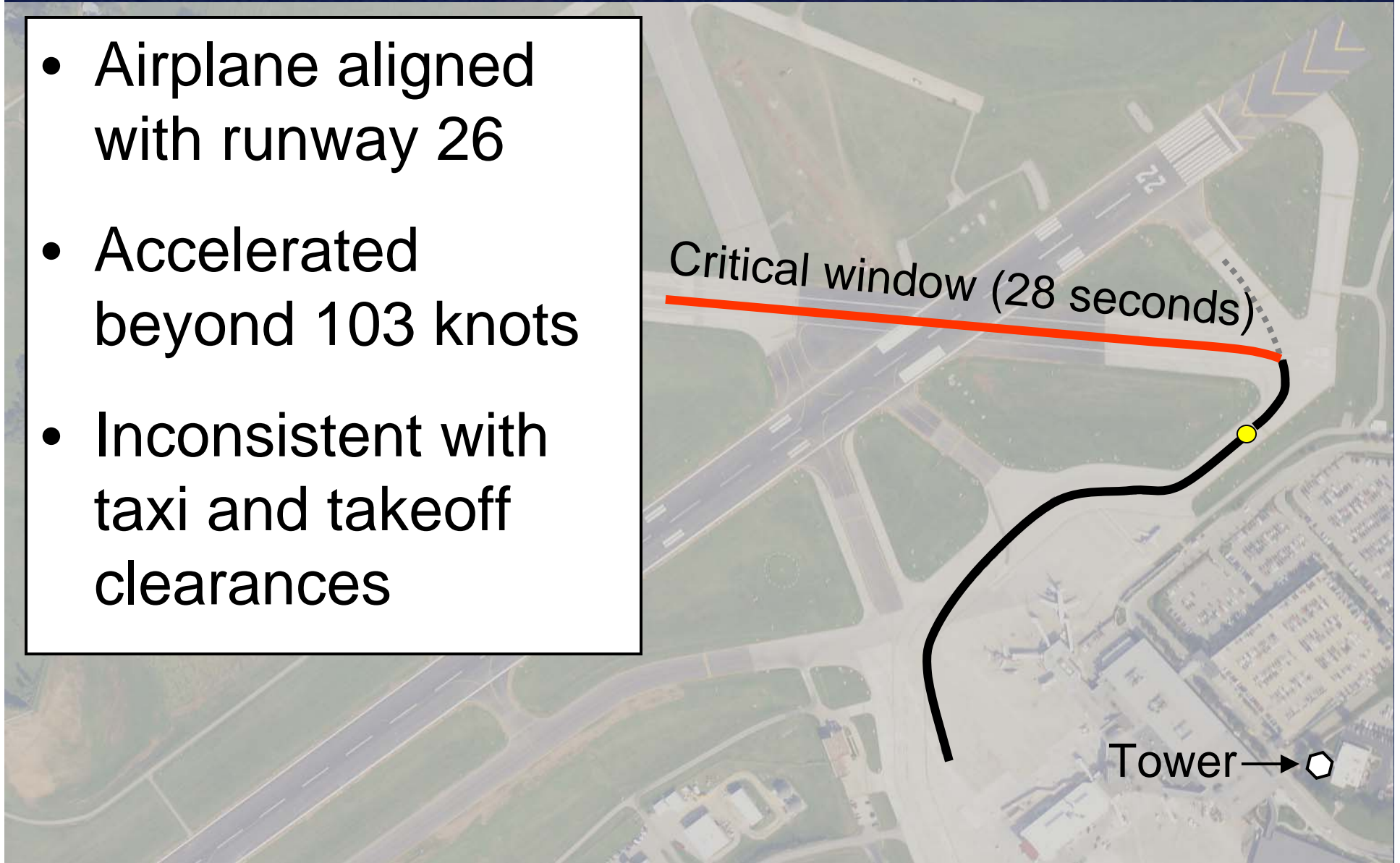


Critical Window

- Airplane aligned with runway 26
- Accelerated beyond 103 knots
- Inconsistent with taxi and takeoff clearances

Critical window (28 seconds)

Tower →



Monitoring Policy and Training

- Monitoring provides defense against threats to flight safety
- Guidance on duty priorities could be improved

Monitoring Policy and Training

- Potential deficiencies in controller vigilance, judgment, and safety awareness
- April 2007 Safety Recommendation A-07-34
 - Require resource management training for controllers

Consideration of Staffing

- Workload not excessive
- Last radar task completed before critical window
- Controller might still have performed lower-priority task
- Second (radar) controller not likely to have noticed

Controller Fatigue

- Two hours sleep in 24 hours
- Controller was most likely fatigued
- Fatigue can degrade performance
- Effect of fatigue could not be determined

Controller Fatigue

- Impact of fatigue on controller performance
- April 2007 Safety Recommendations A-07-30 through -32:
 - Revise shift schedules
 - Develop fatigue awareness and countermeasures training



NTSB